

Appl. No. 10/814,408  
Atty. Docket: 2002B139/2  
Preliminary Amendment dated August 20, 2007  
Reply to Advisory Action dated June 13, 2007

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### REMARKS/ARGUMENTS

#### Claim Status and Request for Reconsideration

Reconsideration of this application is requested. The claims presented for reconsideration are claims 24 and 30-33. No amendments have been made. A Declaration Submitted Under 37 C.F.R. § 1.132 is attached.

#### Claim Rejections - 35 U.S.C § 103

Claims 24 and 30-33 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 2,892,773 to Hirsch *et al.* (hereinafter "Hirsch"), in view of U.S. Patent No. 4,092,722 to Hofferber *et al.* (hereinafter "Hofferber"), and further in view of U.S. Patent No. 3,213,014 to Atkinson *et al.* (hereinafter "Atkinson"). This rejection is traversed and reconsideration is requested.

This invention is directed to an oxygenates to olefins fluidized bed reactor apparatus for converting an oxygenate feed to olefins in a riser reactor. The apparatus is configured such that the amount of coke on catalyst can be more easily controlled during operation, and so that space velocity through the reactor can be more effectively controlled. The overall coke composition in the riser reactor portion of the apparatus can be affected by the use of a regenerator catalyst circulation valve and a catalyst circulation control valve. Control of space velocity can also be effectively controlled by appropriately controlling catalyst circulation from the disengaging vessel to the riser reactor. Control of catalyst circulation in this manner can make a significant impact on selectivity to specific olefin product formation and on conversion.

The cited Hirsch patent discloses a fluidized catalytic cracking process in which catalyst particles are transferred between a hopper, reactor, and regenerator in a manner to transfer heat and restore catalyst activity. The catalyst particles are transferred from a catalyst hopper 16 to riser reactors 10a, 10b, and back to the catalyst hopper. A portion of the catalyst from the catalyst hopper is also transferred from the hopper to a regenerator 40. From the regenerator, the catalyst is transferred back to the hopper by periodically changing direction of pressure differential between the hopper and regenerator. A differential pressure controller 47 works in conjunction with a timer 48 to control the opening and closing valves 46, 60, 68, 70, and 62. The

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opening and closing of the various valves control the rate and direction of flow of catalyst between the hopper 16 and the regenerator 40.

One significant difference between Hirsch and the claimed invention is that the Hirsch control valves are controlled as a function of pressure, not temperature, as required by the claims. Although the Hirsch control valves are controlled as a function of pressure rather than temperature, it has, nevertheless, been alleged in the Advisory and Final Office Actions that the use of temperature control means to control flow from the regenerator to the lift gas riser as a function of temperature would have been obvious. More specifically, it has been alleged that substitution of a temperature type flow control means of the type disclosed in Hofferber for Hirsch's flow control valve 60 would have been obvious. This allegation is, however, based on a misunderstanding of how the Hofferber and Hirsch processes function, and is, therefore, believed to be in error.

To more fully explain the technical details of how the Hirsch and Hofferber processes function, Applicant has submitted with this response a Declaration Submitted Under 37 C.F.R. § 1.132 by the inventor, Dr. James Lattner, who is considered one of at least ordinary skill in the art. In the Declaration, Dr. Lattner points out that the Hirsch process uses a differential pressure controller 47 in conjunction with a timer 48 to control the opening and closing valves 46, 60, 68, 70, and 62. The opening and closing of the various valves control the rate and direction of flow of catalyst between the hopper 16 and the regenerator 40.

Dr. Lattner also notes that Hofferber uses controllers 52 and 53 to control the opening and closing of valve 9 to adjust the temperature of the bed in the reactor. It is the opinion of Dr. Lattner that "replacing flow control valve 60 of Hirsch with the flow control valve 9 of Hofferber would not lead to a functioning system." See Declaration, Paragraph 10. Dr. Lattner's reasoning for his conclusion is based at least in part on the fact that

the Hirsch system depends on each of the valves 46, 60, 68, 70 and 62 to work in conjunction with the timer 48 and the differential pressure controller 47 to control the rate and direction of flow of catalyst between the hopper 16 and the regenerator 40. If any one of these valves were disconnected from the timer and pressure controller, then flow rate, direction or both would be completely disrupted. If Hofferber's temperature controlled valve 9 were

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substituted for Hirsch's valve 60, there would be no way to regulate flow of catalyst from the regenerator 40 to the hopper 16, since directional flow is based on pressure control between regenerator 40 and hopper 16. This means that switching a flow control valve for a temperature controlled valve in Hirsch's transfer line 58 would completely destroy the ability to send catalyst from the regenerator 40 to the hopper 16, thereby shutting down the entire system.

[*Id.*]

As Dr. Lattner further concludes, "one that understands the type of processes used by Hirsch and Hofferber would not substitute a temperature controlled type valve arrangement for a pressure controlled type arrangement and expect to have a functioning system." *Id.* Therefore, according to the opinion of one of ordinary skill in the art, the combination of Hirsch and Hofferber, in the manner suggested in the Advisory and Final Office Actions, would not result in a functioning system.

The Hirsch device further differs from the claimed invention in that Hirsch also does not have a catalyst circulation control valve that is capable of controlling circulation of catalyst from the disengaging vessel to the riser reactor, as a function of the difference in pressure between an upper portion of said riser reactor and a lower portion of the riser reactor. However, it has been alleged in the Advisory and Final Office Actions that because the Atkinson patent discloses the use of a controller that uses a differential pressure reading in the transfer conduit between the regenerator and reactor, it would have been obvious to substitute a type of differential pressure control valve for Hirsch's valves 28a, 28b.

Atkinson discloses means for indirectly determining catalyst activity by determining the heat content of the materials passing into the reactor at two different points of travel through a transfer conduit 18, in which catalyst is passed from the regenerator 13 to a reactor 11. Atkinson uses temperature and pressure differentials of the catalyst passing through the transfer conduit to calculate the heat load and adjust the flow of catalyst through the transfer line 18 or the flow of oxygen to a transfer conduit 36, in which catalyst is passed from the reactor 11 back to the regenerator 13.

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As noted by Dr. Lattner in the attached Declaration, Atkinson does not have any valve that controls transfer of catalyst from a "disengaging vessel for receiving riser reactor effluent" back to the riser reactor, as required by claim 1. The only vessel in Atkinson that might be considered a type of "disengaging vessel for receiving riser reactor effluent" is the reactor vessel 11. The only portion of Atkinson's reactor system that might be considered equivalent to an actual riser reactor is the upper end of transfer conduit 18 as it approaches the reactor 11. Atkinson does not have a line connecting the reactor vessel (e.g., "disengaging vessel for receiving riser reactor effluent") to the riser conduit. Because this line itself does not exist, Atkinson can not disclose any valve capable of controlling circulation of catalyst from a "disengaging vessel for receiving riser reactor effluent" back to a riser reactor as a function of pressure. As Dr. Lattner states at Paragraph 13 of his Declaration, "it is incorrect to conclude that it would have been obvious to one that adequately understands the type of processes used by Hirsch and Atkinson to substitute any Atkinson valve for valves 28a, 28b of Hirsch."

As demonstrated by the attached Declaration of Dr. Lattner, the allegation in the Advisory Action and the previous Final Office Action that one of ordinary skill in the art would have found the claimed invention obvious in view of the combination of Hirsch, Hofferber and Atkinson is incorrect. The substitution of Hofferber's temperature control valve in Hirsch's pressure control system would not result in a function system, and Atkinson does not disclose any valve capable of controlling circulation of catalyst from a "disengaging vessel for receiving riser reactor effluent" back to a riser reactor as a function of pressure, since Atkinson does not have a line connecting the reactor vessel (e.g., "disengaging vessel for receiving riser reactor effluent") to the riser conduit. Accordingly, the combination of references does not suggest Applicant's claimed invention.

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**CONCLUSION**

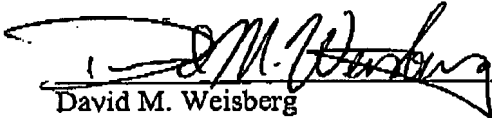
Having demonstrated that the cited references fail to disclose or suggest the invention as claimed, and all other formal issues having now been fully addressed, this application is believed to be in condition for allowance. Accordingly, Applicant's request early and favorable reconsideration in the form of a Notice of Allowance.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated, since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response. Please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1712 (Docket #: 2002B139/2).

Respectfully submitted,

Date: 8/20/07

  
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